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Kanazawa

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(54) **TRANSMISSION DEVICE OF FOUR-WHEEL
 DRIVE VEHICLE**

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(56) **References Cited**

U.S. PATENT DOCUMENTS

4,208,923 A * 6/1980 Ikegami 74/665 G

5,123,293 A * 6/1992 Umemoto et al. 74/333
 5,640,882 A * 6/1997 Meuller 74/333 X
 5,947,218 A * 9/1999 Ishimaru 74/665 G X
 6,044,720 A * 4/2000 Matsufuji 74/331
 6,332,371 B1 * 12/2001 Ohashi et al. 74/331

FOREIGN PATENT DOCUMENTS

JP 7-167257 7/1995
 JP 362178429 A * 8/1997 180/233

* cited by examiner

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(57) **ABSTRACT**

A transfer drive gear is provided at the rear end of a hollow counter shaft disposed under an input shaft. A reduction driven gear is provided at the rear end of a front drive shaft inserted in the counter shaft. The transfer drive gear and the reduction driven gear are engaged with a transfer driven gear which is integrally formed with an intermediate output shaft and a reduction drive gear. The rear end side of the intermediate output shaft is coupled with the front end side of a rear drive shaft through a torque coupling device, so that an FF based on the four-wheel drive vehicle can be formed.

13 Claims, 5 Drawing Sheets

